

2008 Chesapeake Bay Blue Crab Advisory Report

Approved by the Fisheries Steering Committee: July 21, 2008

Status of the stock:

In 2006, the NOAA Chesapeake Bay Stock Assessment Committee (CBSAC) adopted the Bay-wide winter dredge survey (WDS) as the primary indicator of blue crab stock status because it is the most comprehensive and statistically robust of the blue crab surveys conducted in the Bay¹. The WDS measures the density of crabs (number per 1,000 square meters) in Chesapeake Bay. These densities are then adjusted for the efficiency of the sampling gear and expanded to the area of Chesapeake Bay in order to derive precise annual estimates of abundance of over-wintering crabs by age and gender grouping.

The abundance of spawning age crabs (age 1+) is a key indicator of stock status, and is used to determine if the population is overfished (see control rule section below). At the beginning of the 2008 commercial season, results of the 2007-2008 WDS indicated that the abundance of age 1+ blue crabs declined slightly from 16 crabs per 1,000 square meters in 2006-2007 to 12 crabs per 1,000 square meters in 2007-2008 (Figure 1). These densities equate to estimates of spawning age abundance of 143 million crabs in 2006-2007 and 120 million crabs in 2007-2008, which is well below the interim target level of 200 million spawning age crabs (Figure 2). The interim abundance target of 200 million spawning crabs was established by the CBSAC in January of 2008 and was accepted by the Chesapeake Bay blue crab management authorities in April of 2008 (Appendix 1).

Recruitment, as measured by the abundance of age 0 crabs, increased slightly in the 2007-2008 WDS. Despite this slight increase over last year, the abundance of young crabs remains well below the survey average (Figure 3). Therefore, 2008 represents a continuation of a period of low recruitment that has persisted since 1997-1998. In the 2007-2008 WDS, female spawning potential (abundance of females greater than 60mm or 2.4 inches carapace width) remained below the average range for the WDS (Figure 4).

A management control rule is used to determine the status of the Chesapeake Bay blue crab stock and guide management decisions. Despite continued low abundance, the blue crab stock remains above the abundance (overfished) threshold of 86 million age 1+ crabs, but below the interim target abundance of 200 million (Figure 5). The exploitation fraction for 2007 (percentage of crabs removed from the population by fishing) was estimated to be 55%, which is above the overfishing threshold of 53%. One change from previous advisory reports was the incorporation of recreational harvest into the annual exploitation fractions. Landings from recreational crabbers was estimated to be 8% (Ashford and Jones 2002)² of the total harvest for all years. When considering both commercial and recreational harvest, the exploitation fraction has been above the target exploitation fraction of 46% in 9 of the last 10 years. Further, the exploitation fraction has not fallen below the overfishing threshold for more than 2 consecutive years since the mid-1990's.

Data from three supporting blue crab surveys (the Maryland and Virginia trawls and the Calvert Cliffs Pot study) were also reviewed. Results of these surveys are presented in Appendix 2 of this report. The results of these surveys were generally consistent, showing an overall decline of crab abundance in 2007.

Harvest:

The 2007 Bay-wide crab harvest of 43.5 million pounds is the lowest recorded since 1945 (Figure 6). The 2007 Maryland harvest of 23.7 million pounds is the second lowest recorded, but above the historical low of 20 million pounds observed in 2000. Virginia's harvest of 17.4 million pounds is the lowest recorded since the mid-1970s (Figure 7).

Projected harvest and exploitation:

The 2007-2008 WDS resulted in an estimated total abundance of 280 million crabs. Based on the historical relationship between crab abundance estimated from the WDS and the subsequent harvest, the 2008 harvest is predicted to be 49 million pounds with a possible range of 33.4 to 65 million pounds based on 95% prediction intervals (Figure 8). This projection is based on fishery performance in the absence of any additional regulatory action that could limit harvest.

In 2008, the Bay management jurisdictions took action to reduce female harvest by 34%, which is equal to a total harvest reduction of 17%, since the Bay-wide harvest is divided equally among male and female crabs. This reduction was based on the difference between the projected harvest of 49 million lbs and the harvest (in pounds) that would be equivalent to 46% of the estimated 2008 crab abundance, which would be approximately 40 million lbs.

Control rule:

The control rule, which was adopted by the Bi-State Blue Crab Advisory Committee in 2001³, and updated in the 2005 stock assessment⁴, is the foundation for sustainable management of the blue crab fishery in Chesapeake Bay. The control rule represents the relationship between adult crab abundance (millions of crabs), exploitation (the fraction of crabs removed by the fishery in a year) and management reference points. In 2006 the CBSAC defined the overfished limit to be 86 million age 1+ crabs. This value, observed in the 1999-2000 WDS, is the lowest value in the 17-year WDS time series, and delineates the overfished threshold based on a lack of historical evidence that a sustainable fishery can be maintained at an age 1+ abundance that is less than 86 million crabs. The overfishing definition, or exploitation threshold, for this stock is based on the consensus that a minimum of 10% of the spawning potential of an unfished population must be preserved to reliably produce the next generation of crabs. The target exploitation fraction of 46%, maintained over several years, represents an exploitation fraction that would preserve 20% of the unfished spawning potential.

Special comments:

In January 2008, CBSAC established an interim rebuilding target of 200 million spawning age (1+) crabs. The committee also recommended that the jurisdictions take action to achieve this target and specified that management action expanding protection for mature female crabs would maximize the odds of increasing recruitment and rebuilding the blue crab stock. In making these recommendations, CBSAC recognized that blue crab recruitment is strongly influenced by environmental drivers which could prevent an immediate substantial increase in recruitment (age 0 abundance) despite increased adult abundance. Ultimately, effective management of the blue crab requires implementation of ecosystem-based approaches that deal not only with the fishery, but also with broader issues such as habitat quality and food web interactions.

The regulatory actions taken in 2008 were coordinated among the three management jurisdictions and were designed to protect the 2008 cohort of female crabs migrating down the Bay in fall, and the subsequent spring to the spawning grounds in Virginia.

As a result of the 2005 blue crab stock assessment, a number of changes and improvements have been made in our analysis of stock status. Harvest has been adjusted to account for a number of historical changes in estimation methodology employed by the Maryland Department of Natural Resources and the Virginia Marine Resources Commission⁵. Additionally, annual harvest has been adjusted to include landings from both the commercial and recreational fisheries. In constructing the control rule, the annual estimates of abundance and exploitation fraction use data from the WDS and reported fishery harvest.

Critical data needs:

It is critical that robust, fishery-dependent data collection programs be implemented for blue crabs throughout the Chesapeake Bay. The design of these programs should be based on the need for improved information on biological characteristics of the harvest and reliable effort data for the commercial and recreational fisheries. A collaborative and coordinated Bay-wide fishery-independent survey focused on the spring through fall distribution and abundance of blue crabs remains important.

Chesapeake Bay Stock Assessment Committee Members:

Chris Bonzek VIMS

Lynn Fegley Maryland DNR - chair

John Hoenig VIMS

Tom Miller CBL

Rob O'Reilly VMRC

Derek Orner NMFS/NCBO

Alexei Sharov Maryland DNR

Joe Idoine NMFS/NEFSC

Doug Vaughan NMFS/SEFSC

Also participating:

Eric Johnson SERC

Glenn Davis Maryland DNR

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